

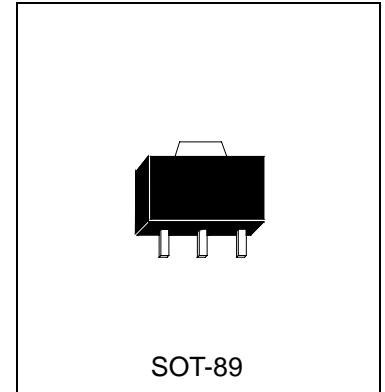


# HBT169M

THYRISTORS

## Description

Glass passivated, sensitive gate thyristors in a plastic envelope, intended for use in general purpose switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.



## Quick Reference Data

Symbol	Parameter	Max.	Unit
$V_{DRM}, V_{RRM}$	Repetitive peak off-state voltages	400	V
$I_{T(AV)}$	Average on-state current	0.5	A
$I_{T(RMS)}$	RMS on-state current	0.8	A
$I_{TSM}$	Non-repetitive peak on-state current	8	A

## Pin Configuration

Pin	Description		Symbol
1	Gate		
2	Anode		
3	Cathode		

## Limiting Values

Symbol	Parameter	Min.	Max.	Units
$V_{DRM}, V_{RRM}$	Repetitive peak off-state voltages	-	400	V
$I_{T(AV)}$	Average on-state current (half sine wave; $T_{lead} \leq 83^{\circ}C$ )	-	0.5	A
$I_{T(RMS)}$	RMS on-state current (all conduction angles)	-	0.8	A
$I_{TSM}$	Non-repetitive peak on-state current (t=10ms)	-	8	A
	Non-repetitive peak on-state current (t=8.3ms)	-	9	A
$I^2t$	$I^2t$ for fusing (t=10ms)	-	0.32	A <sup>2</sup> S
$dI_T/dt$	Repetitive rate of rise of on-state current after triggering ( $I_{TM}=2A; I_G=10mA; dI_G/dt=100mA/us$ )	-	50	A/us
$I_{GM}$	Peak gate current	-	1	A
$V_{GM}$	Peak gate voltage	-	5	V
$V_{RGM}$	Peak reverse gate voltage	-	5	V
$P_{GM}$	Peak gate power	-	2	W
$P_{G(AV)}$	Average gate power (over any 20ms period)	-	0.1	W
Tstg	Storage temperature	-	150	°C
Tj	Operating junction temperature	-	125	°C



### Thermal Resistances

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Rth j-lead	Thermal resistance junction to lead	pcb mounted; lead length=4mm	-	-	60	K/W
Rth j-a	Thermal resistance junction to ambient		-	150	-	K/W

### Static Characteristics (Ta=25°C)

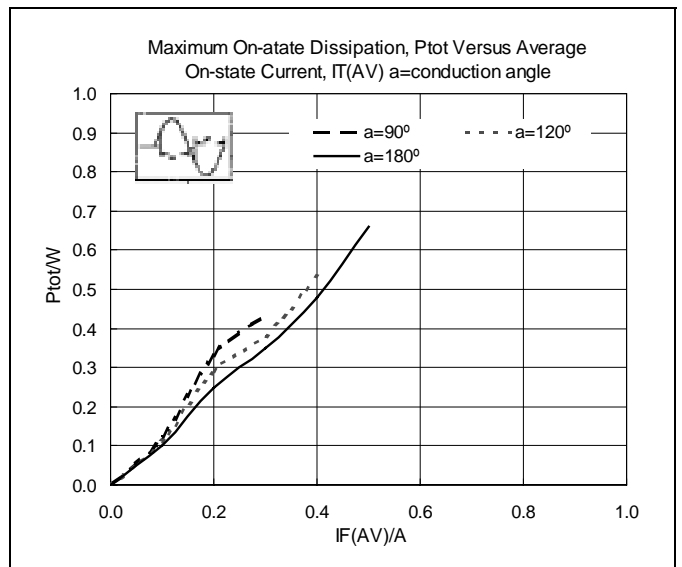
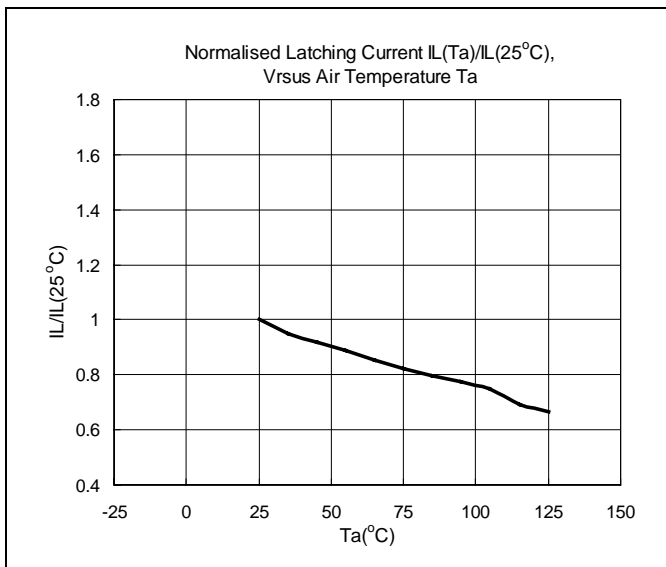
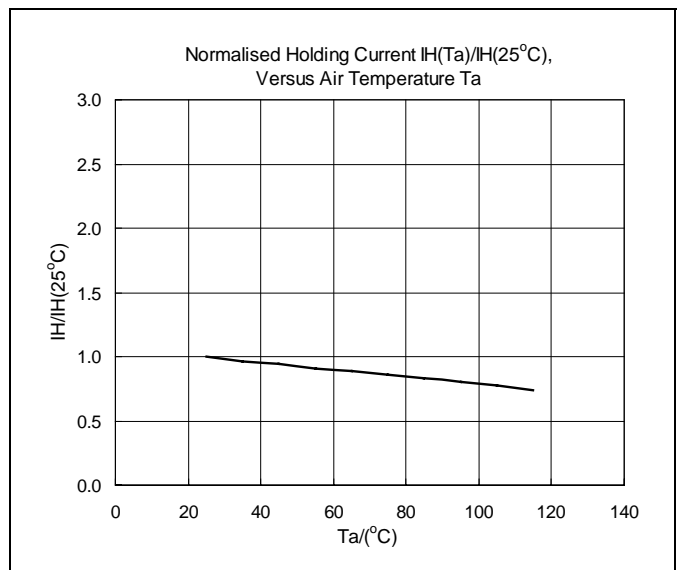
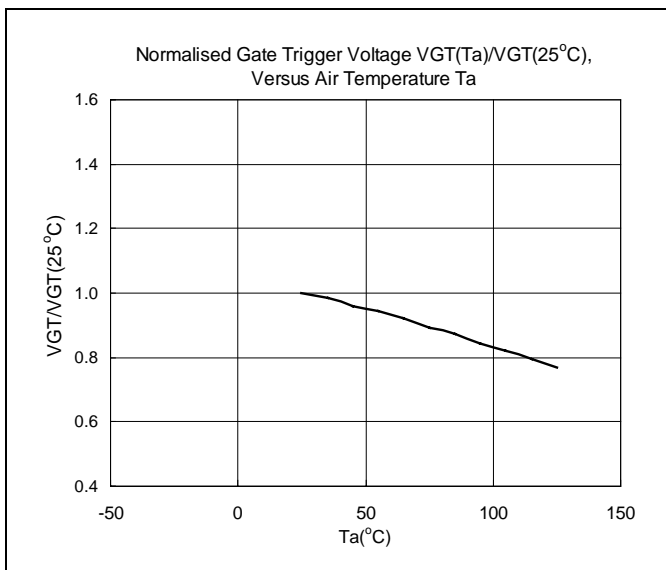
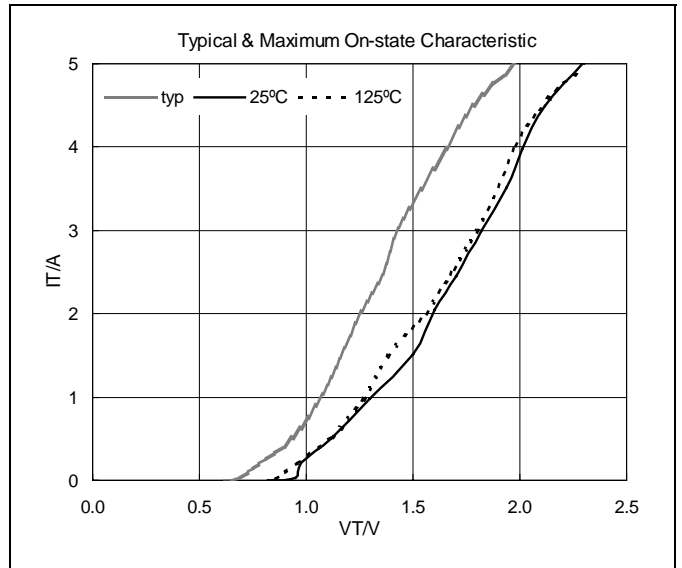
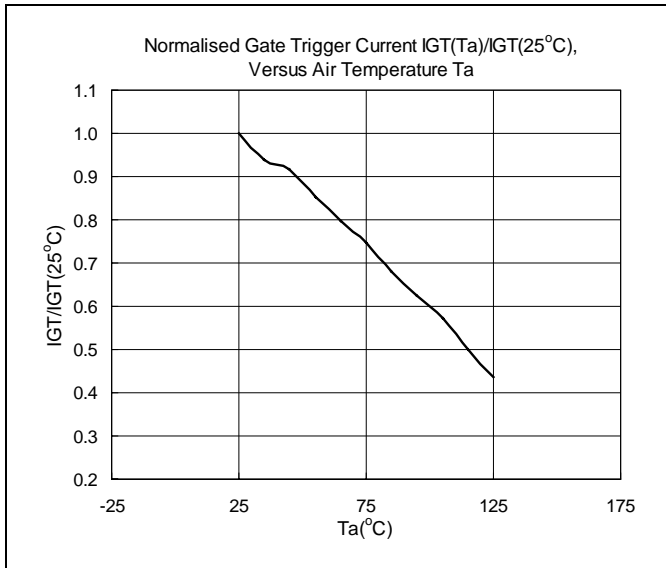
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>GT</sub>	Gate Trigger Current	V <sub>D</sub> =12V, I <sub>T</sub> =10mA Gate open circuit	-	50	200	uA
I <sub>L</sub>	Latching Current	V <sub>D</sub> =12V, I <sub>GT</sub> =0.5mA; R <sub>GK</sub> =1kΩ	-	2	6	mA
I <sub>H</sub>	Holding Current	V <sub>D</sub> =12V, I <sub>GT</sub> =0.5mA; R <sub>GK</sub> =1kΩ	-	2	5	mA
V <sub>T</sub>	On-state Voltage	I <sub>T</sub> =1A	-	1.2	1.35	V
V <sub>GT</sub>	Gate Trigger Voltage	V <sub>D</sub> =12V, I <sub>T</sub> =10mA Gate open circuit	-	0.5	0.8	V
		V <sub>D</sub> = V <sub>DRM(max)</sub> ; I <sub>T</sub> =10mA; T <sub>j</sub> =125°C Gate open circuit	0.2	0.2	-	V
I <sub>D</sub> , I <sub>R</sub>	Off-state Leakage Current	V <sub>D</sub> =V <sub>DRM(max)</sub> ; V <sub>R</sub> = V <sub>RRM(max)</sub> ; T <sub>j</sub> =125°C; R <sub>GK</sub> =1kΩ	-	0.05	0.1	mA

### Static Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
dV <sub>D</sub> /dt	Critical rate of rise of off-state voltage	V <sub>DM</sub> =67% V <sub>DRM(max)</sub> ; T <sub>j</sub> =125°C exponential waveform; R <sub>GK</sub> =1kΩ	500	800	-	V/us
tgt	Gate controlled turn-on time	I <sub>TM</sub> =2A; V <sub>D</sub> =V <sub>DRM(max)</sub> I <sub>G</sub> =10mA; dI <sub>G</sub> /dt=0.1A/us	-	2	-	us
tq	Circuit commutated turn-off time	V <sub>D</sub> =67% V <sub>DRM(max)</sub> ; T <sub>j</sub> =125°C I <sub>TM</sub> =1.6A; V <sub>R</sub> =35V; dI <sub>TM</sub> /dt=30A/us dV <sub>D</sub> /dt=2V/us; R <sub>GK</sub> =1kΩ	-	100	-	us

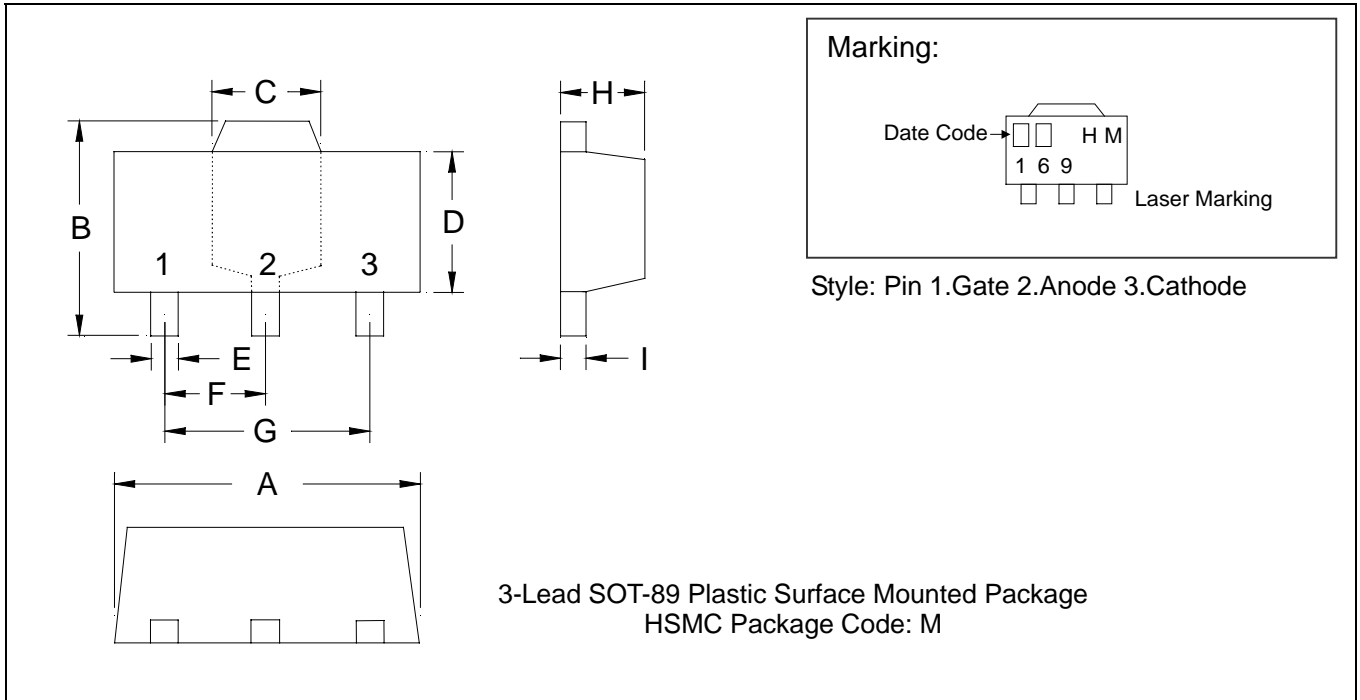


### Characteristics Curve





### SOT-89 Dimension



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1732	0.1811	4.40	4.60	F	0.0583	0.0598	1.48	1.52
B	0.1594	0.1673	4.05	4.25	G	0.1165	0.1197	2.96	3.04
C	0.0591	0.0663	1.50	1.70	H	0.0551	0.0630	1.40	1.60
D	0.0945	0.1024	2.40	2.60	I	0.0138	0.0161	0.35	0.41
E	0.0141	0.0201	0.36	0.51					

- Notes:**
- 1.Dimension and tolerance based on our Spec. dated May. 05,1996.
  - 2.Controlling dimension: millimeters.
  - 3.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
  - 4.If there is any question with packing specification or packing method, please contact your local HSMC sales office.

**Material:**

- Lead: 42 Alloy ; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

**Important Notice:**

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of HSMC.
- HSMC reserves the right to make changes to its products without notice.
- **HSMC semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- HSMC assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.

**Head Office And Factory:**

- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F., No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.  
Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C  
Tel: 886-3-5983621~5 Fax: 886-3-5982931